Low Vision Services
Perkins School for the Blind
Watertown, Massachusetts

SUGGESTIONS FOR MODIFYING THE HOME AND SCHOOL ENVIRONMENT

A Handbook for Parents and Teachers of Children with Dual Sensory Impairments

By
Vickie Brennan
Flo Peck
Dennis Lolli

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Vickie Brennan, M.Ed., M.S.
Flo Peck, M.Ed.
Dennis Lolli, M.Ed., C.A.G.S.

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I. INTRODUCTION

This handbook has been designed for parents and teachers of children with dual sensory impairments and other physical limitations. It contains practical, affordable and easily implemented suggestions for enhancing the child's learning and mobility by making the environment more visible.

The child's environment -- home, education program, and the community -- plays an important role in how well the child is able to see and perform. It is frequently assumed by parents, teachers and doctors that if the child does not benefit from glasses, optical devices or medical treatment that nothing can be done to enhance the child's use of vision. The physical needs of the child with multiple impairments, as well as the needs of the other children in the class may overwhelm the parent or teacher from making simple modifications to the home or classroom. The child's use of functional vision can be greatly enhanced through observation of the child and experimentation with the environment, combined with knowledge of the visual disorder and how vision is affected.

No two children with visual impairments see the world the same way. There are many factors that influence how well a child sees in a particular situation and why one child sees better than another. The most obvious factors concern the type of vision loss and how it affects visual acuity and fields, color reception, oculomotor and other functions. The

child's cognitive abilities, psychological makeup, level of motivation, social relationships and support systems will also affect how the child approaches his or her visual impairment and the challenges it presents. Parents and teachers may have little control over these factors.

Environmental factors are equally important to how well the child performs visually and are often neglected or overlooked. Lighting, color and contrast, size and distance, and time are factors that can often be easily controlled with adaptations that require little time and expense. The parent and teacher can create an environment or activity that provides the opportunity for the child to have successful visual experiences and encourages the use of vision.

Lighting

The quantity, type, direction, and position of illumination are critical to visual performance. Some children are light-sensitive and may experience pain and discomfort from bright or direct light or glare. Other children need more lighting to see optimally.

It is important to observe the child in a variety of lighting situations and to experiment with different light sources. Gooseneck lamps can be directed on the task and positioned to avoid glare. Desk lamps with rheostat controls can vary the amount of illumination. The distance between the light and the work surface will determine the amount of

illumination. Many children with visual impairments prefer incandescent lighting or fluorescent lights without the blue spectrum. Work with the child to help position the lamp independently. Natural light should be used when possible. Facing into direct sources of light should be avoided.

Color and Contrast

Another way to make it easier for the child to see is to increase the contrast between the object the child is working with and its background, and to reduce the number of items around the object. The child with low vision needs a more exaggerated difference between an object and its background for visibility. Black and white provide the greatest contrast, but other color combinations may be optimal, depending on the individual child.

It is important to experiment with colors and sizes of objects, as well as types of lighting when evaluating color contrast. Modifications can be made to a work surface such as table, desk, bureau, workbench, or countertop, by changing the color of the surface. This can be done easily and inexpensively through the use of contact paper, felt, construction paper, placemats and cafeteria trays. Also try changing the color of the objects placed on the surface; this will heighten contrast. Surfaces with confusing patterns should be avoided.

Size and Distance

When there is a loss of visual acuity, an object may be too small to be seen or to be seen well. Its image needs to be made larger for the child to see the object more clearly. This can be done in several ways. Moving closer to the object may make the object visible (the child moves closer to the chalkboard or television). Another option is to increase the size of the object or target (large print, enlarging pictures and materials). Optical devices such as reading glasses, closed circuit televisions, telescopes, and stand and hand-held magnifiers can all be used to magnify the image of an object. Each of the optical devices has its own limitations. Have the child evaluated for use of optical devices during the low vision evaluation with the eye doctor.

Time

The accuracy and speed of performing an activity decrease with the loss of vision. This aspect of visual functioning is often overlooked. Detecting, recognizing, and then acting upon an object require more time for the visually impaired child and can be especially difficult and time-consuming for the child with multiple impairments. In addition, the physical demand of prolonged seeing may cause eye fatigue and reduce the child's speed, accuracy, and attention. Objects and activities that are presented quickly and are moving may be difficult to recognize. The visually impaired child may require more time to locate and discriminate an object. The length of time

for visual activities may need to be increased gradually to avoid eye fatigue.

II. GENERAL CONSIDERATIONS IN WORKING WITH THE CHILD WITH VISUAL AND MULTIPLE IMPAIRMENTS

• Use a multisensory approach which includes visual, auditory and tactual learning, when possible.

• Rather than placing objects into a child's hand, require the student to look at the object, reach for it, and explore it.

• Use of lights that flicker rhythmically should be avoided with children who have a history of seizures.

• Determine with the physical therapist or occupational therapist the child's optimal position before performing visual activities with a child with severe motor involvement.

• Control the teaching environment for children who are easily distracted. Auditory, olfactory, thermal and visual stimuli should be evaluated.

• The child may respond very slowly to visual stimuli due to processing problems, medications, illness, or visual limitations. Allow ample time for a response.

• How the child is responding to visual stimuli may be subtle. Look for other kinds of responses such as body startle, turning the head to avoid the stimuli, widening of the eyes, blinking, an increase or decrease in body activity, or a change in breathing patterns or facial expressions.

• Use opportunities in the child's daily routine to provide visual experiences. Use of functional vision should occur throughout the day, not only during structured activities.

• Remember that some children are very sensitive to light. Other children require additional light to see well.

• Illness, seizures, medications and fatigue can reduce the child's concentration and visual response time. The child may appear to see better on one day than on another, or at a particular time of day.

• Extreme caution is needed when using ultraviolet or "black lights" for vision stimulation activities. It is recommended that lenses with UV protection be used by both students and teachers when using these lights.

• Position the child in the home so that he or she will be close enough to observe and participate in the routine activities of family life.

• Allow the child to develop complete concepts by experiencing where things come from, through sight

and touch. For example, instead of simply filling the child's cup with milk, involve the child in removing the bottle from the refrigerator, removing the lid, pouring the milk and returning the bottle to the refrigerator.

III. INDOOR CONSIDERATIONS FOR HOME AND EDUCATIONAL PROGRAMS

General Suggestions

Many of the following suggestions for organizing the classroom, reducing visual clutter and using color and contrast will benefit all children in the classroom, not just the child with a vision loss. However, some of the specific recommendations will require observation and experimentation with the individual child. These include suggestions for level, type and direction of illumination, and the types of materials used and their placement. Specific information about the child's visual condition and how it affects vision can be obtained from the eye care specialist and the teacher of children with visual impairments.

- Differentiate a child's seat from the other students' by placing a strip of contrasting colored tape on the back of the chair.

- Rheostat controls can be used to vary room illumination.

• Use shades and curtains on windows to control the level of illumination at different times of the day and to avoid glare.

• Use contrasting duct tape on everyday objects to make them more visible such as putting stripes on a bottle or cup.

• Use flat paint to eliminate reflections on large areas such as walls.

• Outline doorways with a contrasting border of color or finish (figure 1).

Figure 1

• Use contrasting colors to differentiate between walls and floors. A wide band of contrasting moulding can also be used.

• Use paint or tape of contrasting color on the edge of steps. The top and bottom step of stairways can be marked with a contrasting stripe.

• Highlight light switches with switchplates of contrasting color to the walls or a band of tape outlining the switchplate.

• Select bright colors for everyday objects such as a red bowl, yellow toothbrush, or colorful clothes.

• Provide a consistent and organized environment. Avoid visual clutter. Keep furniture and objects in consistent places and show the child when furniture is moved. Keep walking areas free of small, low-lying objects.

• Choose tables or desks with chairs that are appropriate in height for the child. This will reduce neck and back fatigue.

• Place signs or symbols used to indicate bathrooms and routes within school buildings at the child's eye level. The sign should be of high contrast to the background and easily located from a distance. The placement, size, colors and symbols used should be consistent.

• Keep doors and cabinets completely open or fully closed.

• Use placemats and tablecloths without patterns to minimize visual clutter at mealtime. Select a background material that contrasts with dishes and utensils.

• Placemats, colored paper, tablecloths, and felt are some of the materials that can be changed to provide contrast to the task the child is performing and to define the work area.

• Different areas of a room can be designated by using different colors on the walls and different colored and textured rugs or mats (figure 2).

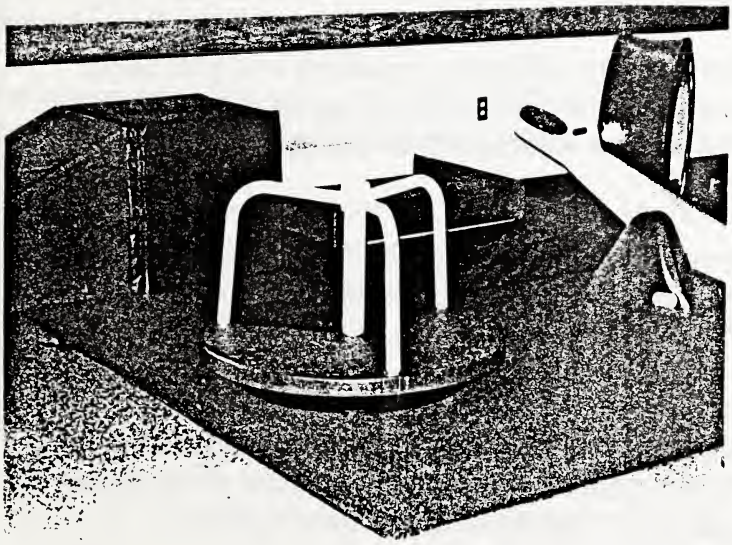

Figure 2

• Keep the child's work area uncluttered. Organize materials and teach the child to return them to their appropriate places.

• Use desk lamps and gooseneck lights with incandescent bulbs directed on the task to experiment with different levels of illumination. Avoid shining the light source directly into the child's eyes.

• Fluorescent lighting using the blue spectrum should be avoided. Replace bulbs that flicker. Use filters on fluorescent lights to reduce glare.

• Use a typoscope (a black page with a horizontal slot cut out to isolate one line of print at a time) over a page of print to reduce glare and to locate the next line of print.

• Experiment with felt-tipped markers and pens and soft leaded pencils for producing teacher-made materials and for writing and drawings made by the child.

• Use a reading stand to elevate reading and writing materials, improve posture, alleviate fatigue and to bring the child's eyes closer to the material.

• To relieve neck and back fatigue, or as an alternative position, the child can read lying on the floor. In this position, the child's eyes are close to the page and he or she is no longer bent over the reading material.

• Use a copier to enlarge materials to experiment with a variety of picture and print sizes. Avoid the use of "purple" dittos for duplicating materials. They are of poor contrast and difficult to read.

• Colored gels or filters can be placed on reading materials and pictures to enhance contrast, reduce glare and alleviate eye fatigue. Gels can be purchased at theater lighting supply stores.

• Be careful that the child is not positioned facing direct light sources, such as looking into windows and lamps. Try positioning the child with his or her back or side to the light source.

• Experiment with presenting materials to the child from the side, at different heights, and straight on, to determine the child's best visual field.

• When purchasing toys, consider color, contrast, patterns and the amount of small detail.

• Shine a light on an object to call a child's attention to it. Be aware that a child may not be able to distinguish a particular object from a cluttered or confusing background.

Classroom Suggestions

Organization

• Organize the classroom by dividing it according to subject areas such as, music, work or snack areas, using furniture, rugs, and colored tape.

• Arrange the furniture so that it is not placed haphazardly throughout the room and is consistently in the same location.

• Secure rugs to eliminate the risk of students tripping over the edges.

• Designate places for materials and toys within their defined content areas.

• Be consistent about returning materials to their designated space.

• Reduce the amount of visual clutter in the classroom. If there are open shelves, eliminate distractions by covering the shelf unit with a piece of solid-colored cloth (figures 3, 4).

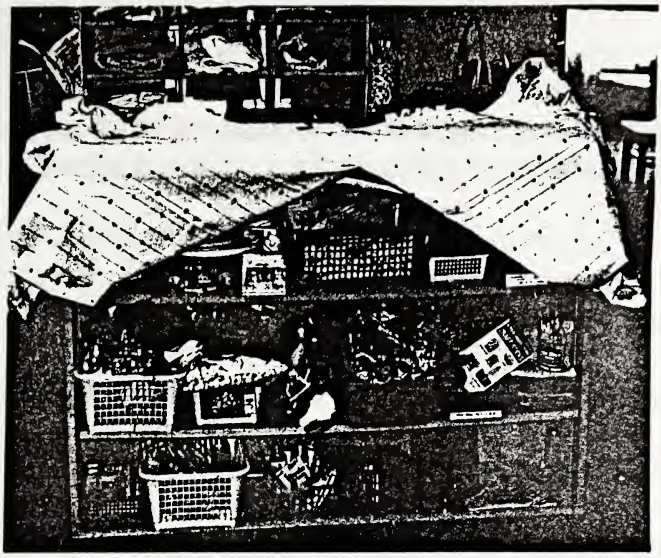

Figure 3

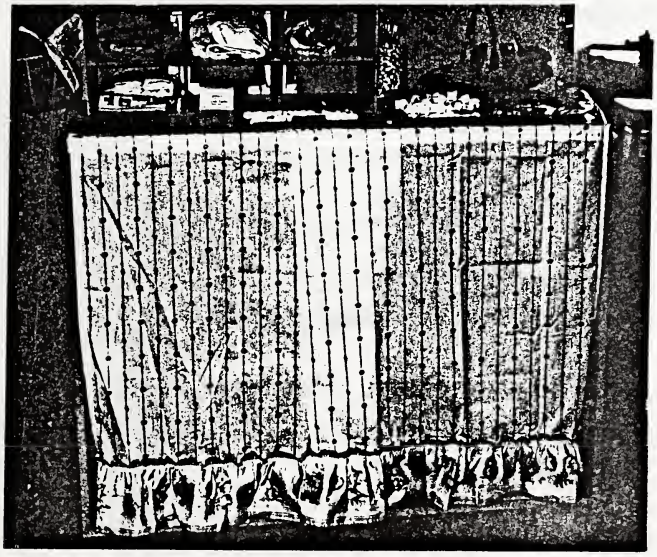

Figure 4

Illumination

• Use curtains and blinds on windows to control the level of illumination at different times of the day and to avoid glare.

• Use non-reflective surfaces to eliminate glare from overhead lighting.

• Use individual lighting such as a gooseneck lamp to focus on a specific task. Teach the child to position the light independently.

• Seat the student with his or her back to the window to reduce distractions and discomfort from the light.

Selection and Adaptation of Materials

• Use a consistent visual and tactual cue such as a piece of colored tape on the back of the child's chair. If the child has a different chair for different activities, place identical cues on each.

• Use contrasting colors for all activities. Ideal contrasting colors are black and white.

• Avoid using a patterned background such as a checkered table cloth or flowery contact paper for work surfaces .

• Hang objects such as Slinky's, black and white objects, or mylar materials at varying heights in front of the window .

• Outline materials with a contrasting color. For example, if the child manipulates puzzle pieces tactually due to his visual impairment, try outlining the indentation on the puzzle with a black marker.

• Place an outline of contrasting color on adapted switches for better definition.

• Use mirrors placed at the child's height to increase body awareness.

• Enhance toys that are not visually stimulating with colored tape to provide more contrast.

• Use visual and tactual symbols or signs along the child's route to provide cues for orientation and mobility purposes (figure 5).

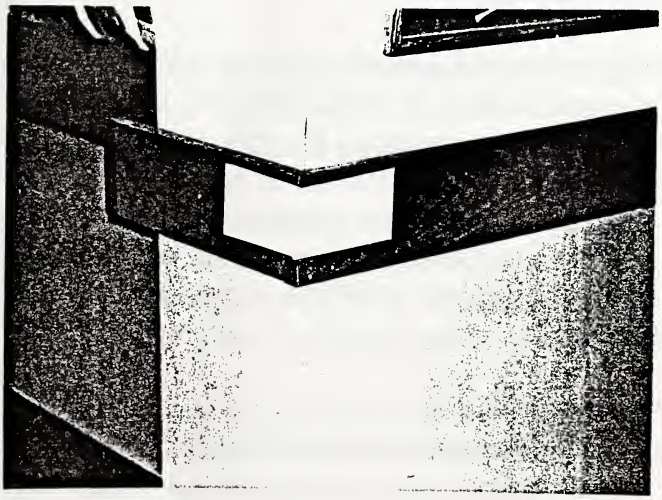

Figure 5

IV. OUTDOOR CONSIDERATIONS

We sometimes hear teachers or parents say things such as, "Oh! He has no problems getting around at school," or "She does fine and never bumps into anything at home." It is not uncommon for children to comfortably move about in familiar locations. Often our first indication that there may be a problem with the way children perceive and/or understand their environment occurs when we observe them in a new and unfamiliar setting.

General Considerations

• Outdoor settings are difficult to control. For some children, it is beneficial to explore a yard or neighborhood with their parent or teacher and to discuss what they see.

• If a child has difficulty adjusting to sudden changes in lighting, consider the use of sunglasses, visors, or hats. Remember, if sunglasses are too dark they will reduce the child's vision. Allow for at least a one week trial period to determine whether the child will use the sunglasses. Consider various styles such as "clip-ons" and "slip-ins" and features such as tinted sideshields.

• Allow children extra time for their eyes to adjust when they enter an area that is brighter or darker.

• The child may also have difficulty with processing visual information. More time and an opportunity to visually explore and identify an object may be needed.

• The amount of background sounds within our environment is often overlooked. Radios, televisions, children playing, lawnmowers and traffic all add to the list of sounds that may be distracting to the child. While it is not possible to remove these stimuli, be aware of the effect they may have on the child's level of attention.

• Depending upon the time of day and what the child has already been doing, the child may approach a task with energy and efficiency or be very fatigued. The child will achieve greater success when well-rested.

• Performing visual activities for extended periods can be quite fatiguing for some children. Visual fatigue leads to decreased performance.

• Some children may need to learn how to visually follow a guide or be physically guided when they are in unfamiliar areas or their vision has decreased. This may also be true for people with night vision problems.

• Do not allow the child to look directly at the sun. This can cause permanent damage to the retina.

Outdoor Environmental Factors

Illumination

• When possible, keep the dominant source of light such as sunlight during the day or street lights at night in back of the child. This reduces glare and highlights the area that the child is moving into or looking toward.

• When talking with a child, position the light source behind the child. This prevents the child from looking directly into the light and highlights the speaker's face.

• Lighting can be directed toward potentially hazardous areas to insure their visibility. Outdoor stairs or changes in elevation can be spotligthed.

• Some children may wish to keep a flashlight with them at night to explore their settings.

• Shadows may obscure obstacles or holes in the ground or create confusing shapes. Encourage the child to stop, slow down and explore, or walk around a shadow.

Color and Contrast

• Contrasting solid strips of color at curbs, steps, or crosswalks make it easier for the child to visually locate these areas. The use of high contrasting paint is an inexpensive method to modify the environment.

However, be judicious and avoid the temptation to over-paint, creating an area which is visually busy or confusing.

• Playground equipment can be painted bright, contrasting colors. Areas of a large playground can be divided by color.

• Brightly colored ribbons, ropes or chains can be used to mark or block-off a hazardous area.

• Wear light colored or reflective clothing after dark for safety.

• Experiment to determine the best size and color of balls or other toys for outdoor play activities.

Size and Distance

• Frequently, moving closer to an object, such as a street sign or store window, is all that is needed to allow better viewing.

• In some cases it is not safe or practical to move closer to an object to view it. An example of this is the destination sign on a bus. An optical device such as a telescope may be useful.

• If there is a reduction in the child's peripheral field, he or she may need to move away to see more of an object.

• If the child has a central field loss, he or she may see an object more clearly by moving closer to it.

Angle of Viewing

• Changing the angle from which an object is viewed may allow the child to more easily identify it. Frequently, children can learn to recognize signs, vehicles and people by the characteristics of their size and shape.

Rate of Movement

• It is easier for the child to spot and recognize an object when both the child and the object are stationary. Begin by having the child stop to scan and locate a stationary object or landmark such as a sign, corner, traffic light, or mailbox. The next step is to introduce activities requiring the child to scan and locate stationary objects while he or she is moving. The most difficult skill is to scan, locate, track and identify a moving target while the child is moving.

Visual clutter

• Keep areas organized and paths clear to reduce visual clutter.

V. INTEGRATING LOW VISION SUGGESTIONS INTO THE CHILD'S COMMUNICATION SYSTEM

Children with visual impairments need to have their low vision goals integrated into their communication system, whatever it may be. Augmentative communication systems are commonly used with children with dual sensory impairments. These systems provide alternative methods for communication if modes such as speaking, writing or signing can not be used effectively. This section describes some visual considerations necessary in developing augmentative communication systems. For more information on augmentative communication systems, please refer to the books listed in the reference section.

Object Calendar Box/Shelf System

In this system, concrete objects are used to illustrate the daily schedule of the student. Objects that are functional and meaningful to the child are used to represent specific activities. For example, an apron may be used to represent a crafts activity or a spoon may be used to represent snack time.

The objects are placed in boxes according to the activity schedule for the day. Choose boxes of shoe box size and position them side by side with a "finished" box at the end of the row. The student carries the object to and from the activity. When the child has completed the activity, the student drops

the object into the "finished" box. The child then picks up the object that represents the next activity.

Organization

• Use solid colored boxes. Avoid patterned backgrounds or baskets with grids. Patterned or grid-like backgrounds increase the amount of visual clutter and make it difficult for the child with low vision to visually locate the object (figure 6).

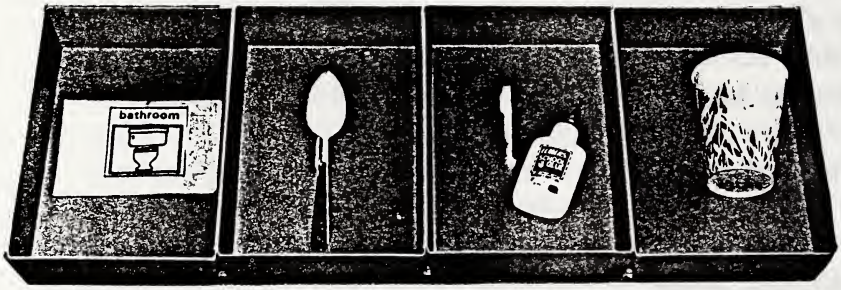

Figure 6

• Use colored backgrounds to assist the child in discriminating one box from another.

• Some students may also need the additional sensory input of tactile cues such as sandpaper on the bottom of one box, soft material in the next, and woolly material in yet another to locate and discriminate the boxes and objects.

• Sequence the boxes from left to right to develop the child's habit of working from left to right.

• Place the boxes in a location that is easily accessible for the child, preferably at eye level.

• Use boxes that are deep enough, but not so deep that the child has difficulty reaching in.

• The "finished" box should be larger than the other boxes and of a different color to discriminate it from the rest (figure 7).

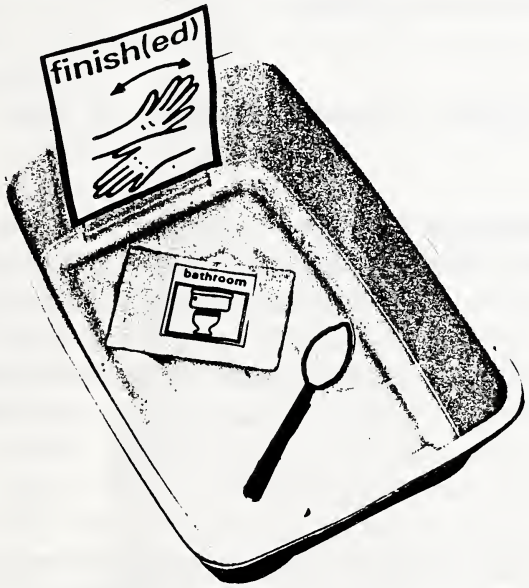

Figure 7

Objects

• Select objects that are functional, motivating, and familiar to the child.

• Use objects that are an appropriate size for the child's level of vision. Objects should be large enough for the child to locate in the boxes, but small enough for the child to carry or wear.

• Use objects which are contrasting in color to the boxes. For example do not use a yellow apron if the box is the same color yellow.

Two-Dimensional Representations of the Objects

The next step in the hierarchy of language development involves using pictures or tracings of concrete objects. A 35 mm camera can be used to take photographs of the objects used in the object calendar box system or the object can be traced with the child. Although instant cameras are handy and easy to use, they may not provide pictures which are clear enough when photographing at close range. To use two-dimensional representations, the child will need to pair the object with the photo or tracing of the object until the object is gradually faded out.

Photographs

• Use a 35 mm camera to obtain clear photographs of the object.

• Photograph the object from a recognizable angle, and from the child's point of view. If possible, the size of the photograph should be similar to the actual size of the object that the child is familiar with.

• Cut out the picture of the object from the background and glue it onto a white or contrasting index card to eliminate any extraneous information.
• Laminate the picture cards using non-glossy, clear contact paper.

Tracings

• Place the concrete object on white or contrasting paper and trace it with a black marker. Allow the child to assist as much as possible.

• Laminate the tracings using non-glossy, clear contact paper.

Print

• Printed words can be used on the picture cards or tracings to identify the activity.

• Write clearly using a print size appropriate to the child's level of vision.

Abstract Symbols

The optimal goal of communication development is the ability to read letters, words, and sentences. Standardized symbols depicting nouns and verbs are used with children who cannot attain that goal. Some examples of these symbols are the Mayer-Johnson pictures and Bliss Symbols. To communicate with others, students carry the symbols with them, use a communication board, or make a book. The symbols are black on white and can be enlarged or reduced in size relative to the individual needs of the child.

• Space symbols appropriately to avoid clutter and confusion.

• Consider visual confusion and clutter when selecting the number of symbols to be placed on a page or communication board.

• Use a reading stand or prop the communication board up at an angle rather than flat on a desk top or wheelchair tray to reduce strain and fatigue on the child's part .

• Consider the child's level of functional vision when selecting an appropriate size and distance for presenting the symbols.

• Avoid backgrounds which are distracting and cluttered.

• Use color cues, if necessary, to outline the symbols for identification of specific items such as outline symbols in red for people, blue for places.

• Position materials appropriately for children with a visual field loss.

• Use appropriate lighting. Avoid glare and shadows from windows and overhead lights (figure 8).

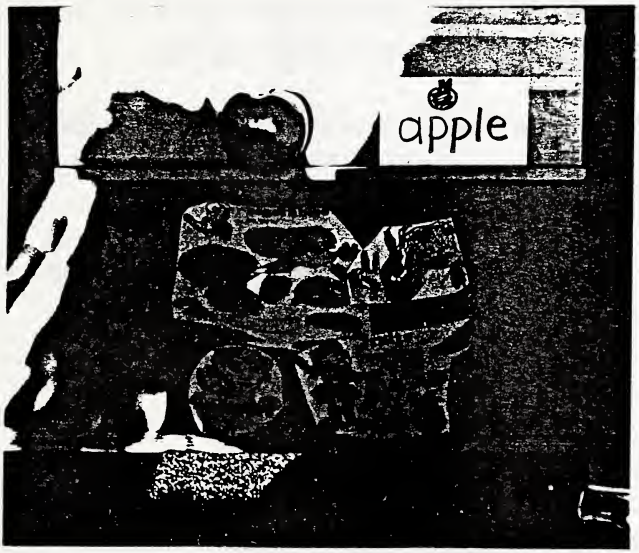

Figure 8

Sign Language

Many factors need to be considered when using sign language with children with visual impairments. Knowledge of the child's vision loss - level of acuity and the placement and degree of the field loss - will help in communicating effectively with the child.

• Wear dark solid-colored clothes to provide a contrasting background to the signs.

• Reduce distractions and avoid wearing an excessive amount of jewelery when signing .

• Use compact signs when possible rather than large hand movements to remain within the child's field of vision.

• Position the child with her back to the light so that the light will not be shining directly into the child's eyes.

• Position signs according to the location of the child's field loss.

• Keep in mind the speed of the person's signs since some children process sensory input slower than others.

• Determine the optimal distance between the signer and the child for the child's level of vision.

• Sign close to your face so that the child can also see facial expressions at the same time.

• Use tactual signs with children who have difficulty interpreting "in the air" signs and in low lighting conditions.

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